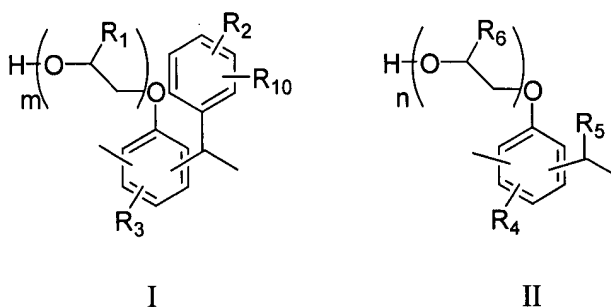


CLAIMS

1. An alkoxyated alkylphenol-arylaldehyde polymer comprising repeating units of formula



wherein R_1 and R_6 are independently H, methyl or ethyl; R_2 and R_{10} are independently H, $\text{C}_1\text{-C}_{18}$ alkyl, $\text{C}_5\text{-C}_{10}$ aryl, hydroxy, alkoxy or halogen; R_3 and R_4 are independently $\text{C}_1\text{-C}_{18}$ alkyl; R_5 is H, $\text{C}_1\text{-C}_3$ alkyl, or arylalkyl or a mixture thereof; and m and n are independently 1 to about 30, wherein the alkoxyated alkylphenol-arylaldehyde polymer comprises 1 to about 40 monomer units of formula I, 0 to about 39 monomer units of formula II and the monomer units of formula I and II are present in a ratio about 1:10 to about 10:1.

2. The alkoxyated alkylphenol-arylaldehyde polymer of claim 1 wherein R_2 and R_{10} are H.

3. The alkoxyated alkylphenol-arylaldehyde polymer of claim 1 comprising about 3 to about 40 repeating units of formula I wherein the monomer unit of formula II is absent.

4. The alkoxyated alkylphenol-arylaldehyde polymer of claim 1 wherein m and n are independently 1 to about 20.

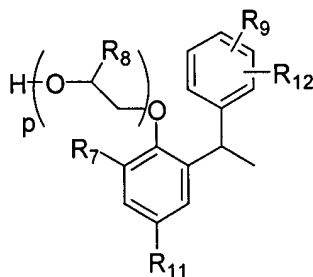
5. The alkoxyated alkylphenol-arylaldehyde polymer of claim 1 wherein R_3 and R_4 are independently $\text{C}_4\text{-C}_{12}$ alkyl.

6. The alkoxyated alkylphenol-arylaldehyde polymer of claim 1 wherein R_1 and R_6 are independently H or methyl.

7. The alkoxyated alkylphenol-arylaldehyde polymer of claim 1 wherein R_5 is H or methyl or a mixture thereof.

8. The alkoxyated alkylphenol-arylaldehyde polymer of claim 7 wherein R_5 is a mixture of H and methyl in a ratio of about 1:10 to about 10:1.

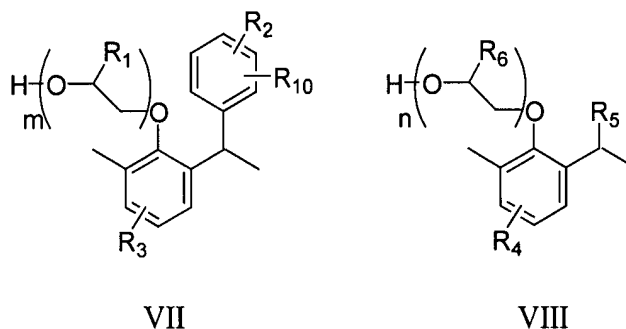
9. The alkoxyated alkylphenol-arylaldehyde polymer of claim 1 further comprising a terminal group of formula III



III

15 wherein R_7 and R_{11} are independently C_1 - C_{18} alkyl; R_8 is H, methyl or ethyl; R_9 and R_{12} are independently H, C_1 - C_{18} alkyl, C_5 - C_{10} aryl, hydroxy, alkoxy or halogen; and p is 1 to about 30.

10. An alkoxyated alkylphenol-arylaldehyde polymer according to claim 1 comprising repeating units of formula VII and VIII



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wherein R_1 and R_6 are independently H, methyl or ethyl; R_2 and R_{10} are independently H, C_1 - C_{18} alkyl, C_5 - C_{10} aryl, hydroxy, alkoxy or halogen; R_3 and R_4 are independently C_1 - C_{18} alkyl; R_5 is H, C_1 - C_3 alkyl, or arylalkyl or a mixture thereof; and m and n are independently 1 to about 30, wherein the alkoxyated alkylphenol-arylaldehyde polymer comprises 1 to about 40 monomer units of formula VII, 0 to about 39 monomer units of formula VIII and the monomer units of formula VII and VIII are present in a ratio about 1:10 to about 10:1.

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11. The alkoxyated alkylphenol-arylaldehyde polymer of claim 10 comprising about 3 to about 40 repeating units of formula VII wherein the monomer unit of formula VIII is absent.

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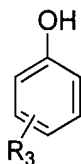
12. The alkoxyated alkylphenol-arylaldehyde polymer of claim 11 comprising about 3 to about 30 repeating units of formula VII wherein m is 1 to about 20; R_1 is H or methyl; R_2 and R_{10} are H; and R_3 is C_4 - C_{12} alkyl.

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13. A demulsifier composition for resolving water-in-oil emulsions comprising one or more alkoxyated alkylphenol-arylaldehyde polymers according to claim 1.

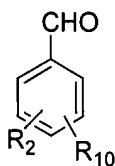
14. A method of preparing the alkoxylated alkylphenol-arylaldehyde polymer of claim 1 comprising:

i) reacting one or more alkylphenols of formula IV



IV

wherein R_3 is H or straight or branched C_1 - C_{18} alkyl, with about 0.05 to about 1.2 molar equivalents of a arylaldehyde compound of formula V

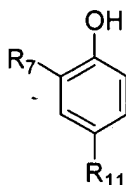


V

wherein R_2 and R_{10} are independently H, straight or branched C_1 - C_{18} alkyl, C_5 - C_{10} aryl, hydroxy, alkoxy or halogen and optionally about 0.05 to about 0.95 molar equivalents of one or more aliphatic aldehydes of formula R_5CHO wherein R_5 is H, C_1 - C_3 alkyl, or arylalkyl to form an alkylphenol-arylaldehyde polymer; and

ii) reacting the alkylphenol-arylaldehyde polymer with about 1 to about 30 molar equivalents of one or more alkylene oxides.

15. The method of claim 14 wherein the alkylphenol comprises a mixture of the alkylphenol of formula IV and a dialkylphenol of formula VI



VI

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wherein R₇ and R₁₁ are independently C₁-C₁₈ alkyl.

16. A method of resolving a water-in-oil emulsion comprising adding to the emulsion an effective demulsifying amount of one or more alkoxyated alkylphenol-arylaldehyde polymers according to claim 1.

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17. The method of claim 16 wherein the water-in-oil emulsion is a crude oil emulsion.

18. The method of claim 17 wherein the crude oil emulsion is a refinery desalting emulsion.

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19. The method of claim 17 wherein the crude oil emulsion is a crude oil production emulsion.